Communicable Disease Case Entry Using PDAs and Public Wireless Networks

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ABSTRACT

Concerns about detecting and responding to attacks with biowarfare agents have resulted in the development of deployable case reporting systems, e.g. RSVP[1]. We implement a proof of concept web-based information system to be used securely from personal digital assistants over public wireless networks, by public health field workers for routine and emergent case reporting. The system collects data for a local health jurisdiction, provides content- and event-based notification, and forwards case reports to the Colorado State communicable disease reporting system (CEDRS). We believe this demonstrates a useful integration of portable and web-based technologies with public health practice.

INTRODUCTION

Concerned about intentional outbreaks of disease, public health has been actively developing electronic reporting and communications infrastructure to extend disease reporting in several ways. First, reporting may need to be done based on temporary, local case definitions that rely on symptom or geographic clusters rather than clinical diagnoses. Second, reporting infrastructure may need to be extended to permit "nomadic", or field reporting, using devices such as PDAs or laptop computers in locations where there is no wired communications infrastructure available.

The Colorado Department of Public Health and Environment has a functioning statewide electronic web-based reporting system called the Colorado Electronic Disease Reporting System (CEDRS). This system allows identified patient, result, contact, provider, and other clinical data to be securely from local health departments and infection control practitioners. The city of Denver, Colorado has a population of 550,000 (2000 census). Denver Public Health (DPH) is charged with the usual public health tasks, including communicable disease reporting, surveillance, and investigation, as well as communicable disease prevention and treatment. DPH makes use of CEDRS, but desired the ability to extend both reporting content and infrastructure.

DPH contracted with the Clinical Informatics Research Group at the University of Washington (CIRG) to develop a proof of concept, PDA based, case reporting system based on public wireless data networks. The system was required to collect data using wireless PDAs, provide notification to DPH, create a DPH reporting database, and both forward cases to, and access updates from, CEDRS.

METHODS/RESULTS

We developed a web-based application to meet these requirements. We used a web application developed in PHP, using the Linux-Apache-MySQL-PHP platform. Through use of HTTP based transactions, we were able to build a query/update interface to CEDRS that allowed access to all 80 data elements. Users can subscribe to alerts via email to pagers, cell phones, or other email devices, based on events such as case arrival, or based on pattern matching of cases for specific content. We developed a web-based interface customized for Pocket PC devices with a screen size of 320x240. We used SSL encryption to provide end-to-end security between the devices and the central server and between the central server and CEDRS. As part of the project, we assessed the application over a number of networks, including T-Mobile and AT&T's GSM/GPRS, Nextel's iDEN, Aerie's Ricochet, and T-Mobile's 802.11b.

The pilot system was implemented in fall of 2002, and demonstrated to several groups of State and DPH public health and information technology professionals. The system met all requirements, and is being considered in planning to expand the public health IT infrastructure.

CONCLUSION & FUTURE DIRECTIONS

We have successfully demonstrated the feasibility of using PDAs over commercial wireless networks to provide secure public health communicable disease case data entry and review, to provide extended reporting capabilities, mobility, and surge capacity.

Further Information:
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[1] Zelicoff A, Brillman J, et. al., The Rapid Syndrome Validation Project (RSVP).Proc AMIA Symp. 2001;:771-5.